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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/619,477	07/19/2000	Shunpei Yamazaki	0756-2178	1881
31780	7590	03/29/2006	EXAMINER	
ERIC ROBINSON PMB 955 21010 SOUTHBANK ST. POTOMAC FALLS, VA 20165			ROSE, KIESHA L	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 03/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/619,477

**Applicant(s)**

YAMAZAKI

**Examiner**

Kiesha L. Rose

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 31,32,35-43,46-53,55 and 56 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 31,32,35-43,46-53,55 and 56 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

This Office Action is in response to the amendment filed 27 September 2005.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 31,32,35-37,39,42 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Prior Art (Fig. 30) in view of Ono et al. (U.S. Patent 5,668,379).

In re claim 31, Applicant's Prior Art (Fig. 30) discloses a semiconductor device that contains a first substrate (1), a thin film transistor over first substrate (Page 2, lines 11-13, both transistor, wiring and connecting wire are formed on the same substrate), a second substrate (5) opposing first substrate, a wiring (6) provided with second substrate, a connecting wiring (3) for electrically connecting wiring of the second substrate to thin film transistor over first substrate (Page 2, lines 19-21, the connecting wire is formed to supply power and input signals to the driver circuit, which is the thin film transistor), wherein connecting wiring comprises a metallic film (3a) over first substrate and a transparent conductive film (3b) over metallic film, an insulating film (9), wherein the wiring of the second substrate is connected to a portion of the connecting

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wiring and wherein both side edges of the portion of the connecting wiring are in contact with the insulating film. Applicant's Prior Art discloses all the limitations except for the metallic film to have a tapered shape. Whereas Ono discloses a thin film transistor (Fig. 17) that contains a metallic film with a taper shape. Ono discloses the metallic film (d1) to have a tapered shape to reduce breakage and gate/drain short circuit can be suppressed. (Column 4, lines 65-67 and Column 5, lines 1-2) Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Applicant's Prior Art (Fig. 30) by incorporating the metallic film to have a tapered shape to reduce breakage and gate/drain short circuit can be suppressed as taught by Ono.

In re claim 32, Ono discloses the insulating film (PSV1) comprises the same material (silicon nitride) as that contained in an insulating film (GI) between a gate wiring and a source wiring of the thin film. (Fig. 3, Column 9, lines 10-11 and Column 12, lines 14-15)

In re claim 35, Ono discloses the metallic film (d1) to have a thickness between 100nm and 1 micron. (Column 9, lines 35-38)

In re claim 36, Applicant's Prior Art discloses the metallic film comprises aluminum. (Page 3, lines 9-10)

In re claim 37, Ono discloses the metallic film to comprise tungsten (W). (Column 9, lines 41-43)

In re claim 39, Ono discloses the transparent conductive film (d2) to have a thickness between 50 nm and 0.5 microns. (Column 10, lines 33-35)

In re claim 42, Applicant's Prior Art discloses the semiconductor device is one of a liquid crystal display device and EL display device. (Page 1, lines 14-15)

In re claim 55, Ono discloses the connecting wiring the same materials as the source wiring and the drain wiring of the thin film transistor. (Figs. 5 and 7 (Both the connecting wiring and source/drain wiring are formed of metallic film (d1) and transparent conductive film (d2))

Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Prior Art (Fig. 30) and Ono as applied to claim 31 above, and further in view of Ukita (U.S. Patent 5,821,159).

In re claim 38, Applicant's Prior Art and Ono disclose all the limitations except for the metallic film to comprise tungsten and a lamination film of tungsten nitride. Whereas Ukita discloses a thin film transistor (Fig. 6) that contains a metallic film (45) made of tungsten with a tungsten nitride layer (46) formed thereon. Tungsten nitride is formed on the tungsten layer to suppress low resistive metal from being dissolved and to prevent corrosion of the metal by the etchant. (Column 4, lines 44-50) Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the devices of Applicant's Prior Art and Ono by incorporating tungsten nitride on the tungsten layer to suppress low resistive metal from being dissolved and to prevent corrosion of the metal by the etchant as taught by Ukita.

Claims 40-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Prior Art (Fig. 30) and Ono as applied to claim 31 above, and further in view of Utsumi et al. (U.S. Patent 6,215,077)

In re claims 40-41, Applicant's Prior Art and Ono disclose all the limitations except for the transparent conductive film to comprise zinc oxide and indium oxide. Whereas Utsumi discloses a thin film device (Fig. 1) that contains a transparent conductive film (3b) that comprises zinc oxide and indium oxide. (Column 4, lines 56-58) The transparent conductive film is formed of zinc oxide and indium oxide to prevent hillocks from being formed on first and second conductors. (Column 3, lines 64-67 and Column 4, lines 1-3) Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the devices of Applicant's Prior Art and Ono by incorporating the transparent conductive film to comprise zinc oxide and indium oxide to prevent hillocks from being formed on first and second conductors as taught by Utsumi.

Claims 43,47 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Prior Art (Fig. 30) in view of Hioki (JP 8-234212).

In re claim 43, Applicant's Prior Art (Fig. 30) discloses a semiconductor device that contains a first substrate (1), a thin film transistor over first substrate (Page 2, lines 11-13, both transistor, wiring and connecting wire are formed on the same substrate), a second substrate (5) opposing first substrate, a wiring (6) provided with second substrate, a connecting wiring (3) for electrically connecting wiring of the second

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substrate to thin film transistor over first substrate (Page 2, lines 19-21, the connecting wire is formed to supply power and input signals to the driver circuit, which is the thin film transistor), wherein connecting wiring comprises a metallic film (3a) over first substrate and a transparent conductive film (3b) over metallic film, an insulating film (9), wherein the wiring of the second substrate is connected to a portion of the connecting wiring and wherein both side edges of the portion of the connecting wiring are in contact with the insulating film. Applicant's Prior Art discloses all the limitations except for a column-shape spacer. Whereas Hioki discloses a liquid crystal display (Fig. 1) that contains a column-shape spacer (24) over thin film transistor (18/20) between first substrate (14) and second substrate (26). The column-shape spacer is formed for intra-surface uniformity. (Constitution) Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Applicant's Prior Art (Fig. 30) by incorporating a column-shape spacer for intra-surface uniformity as taught by Hioki.

In re claim 47, Applicant's Prior Art discloses the metallic film comprises aluminum. (Page 3, lines 9-10)

In re claim 53, Applicant's Prior Art discloses the semiconductor device is one of a liquid crystal display device and EL display device. (Page 1, lines 14-15)

Claims 46,48,50 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Prior Art and Hioki as applied to claim 43 above, and further in view of Ono.

In re claim 48, Applicant's Prior Art and Hioki disclose all the limitations except for the metallic film comprising tungsten. Whereas Ono discloses a thin film transistor (Fig. 3) that contains a metallic film (d1) that comprises tungsten. The metallic film comprises tungsten because it is a high melting point metal. (Column 9, lines 41-43) Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the devices of Applicant's Prior Art and Hioki by incorporating the metallic film to comprise tungsten because it is a high melting point metal as taught by Ono.

In re claim 46, Ono discloses the metallic film (d1) to have a thickness between 100nm and 1 micron. (Column 9, lines 35-38)

In re claim 50, Ono discloses the transparent conductive film (d2) to have a thickness between 50 nm and 0.5 microns. (Column 10, lines 33-35)

In re claim 56, Ono discloses the connecting wiring the same materials as the source wiring and the drain wiring of the thin film transistor. (Figs. 5 and 7 (Both the connecting wiring and source/drain wiring are formed of metallic film (d1) and transparent conductive film (d2))

Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Prior Art (Fig. 30) and Hioki as applied to claim 43 above, and further in view of Ukita.

In re claim 49, Applicant's Prior Art and Hioki disclose all the limitations except for the metallic film to comprise tungsten and a lamination film of tungsten nitride.



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Whereas Ukita discloses a thin film transistor (Fig. 6) that contains a metallic film (45) made of tungsten with a tungsten nitride layer (46) formed thereon. Tungsten nitride is formed on the tungsten layer to suppress low resistive metal from being dissolved and to prevent corrosion of the metal by the etchant. (Column 4, lines 44-50) Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the devices of Applicant's Prior Art and Hioki by incorporating tungsten nitride on the tungsten layer to suppress low resistive metal from being dissolved and to prevent corrosion of the metal by the etchant as taught by Ukita.

Claims 51-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Prior Art (Fig. 30) and Hioki as applied to claim 43 above, and further in view of Utsumi et al.

In re claims 51-52, Applicant's Prior Art and Hioki disclose all the limitations except for the transparent conductive film to comprise zinc oxide and indium oxide. Whereas Utsumi discloses a thin film device (Fig. 1) that contains a transparent conductive film (3b) that comprises zinc oxide and indium oxide. (Column 4, lines 56-58) The transparent conductive film is formed of zinc oxide and indium oxide to prevent hillocks from being formed on first and second conductors. (Column 3, lines 64-67 and Column 4, lines 1-3) Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the devices of Applicant's Prior Art and Hioki by incorporating the transparent conductive film to comprise zinc oxide

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and indium oxide to prevent hillocks from being formed on first and second conductors as taught by Utsumi.

### ***Response to Arguments***

Applicant's arguments with respect to claims 31,32,35-43,46-53 and 55-56 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

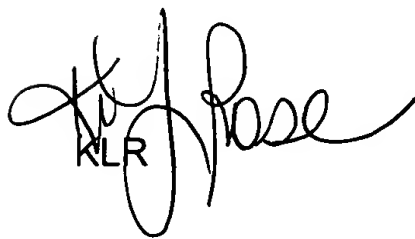
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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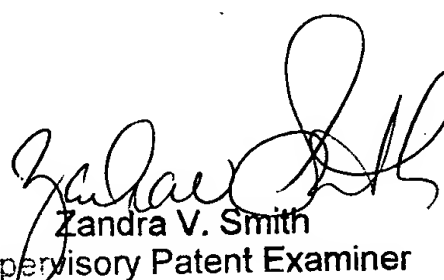
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kiesha L. Rose whose telephone number is 571-272-1844. The examiner can normally be reached on T-F 8:30-6:00 off Mondays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



KLR



Zandra V. Smith  
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3/20/2016